General Frank S. Besson, Jr., CG, AMC is shown receiving the DA Award of Honor for the best Major Command safety program during FY 1967 from Lt. General A. O. Connor, Deputy Chief of Staff for Personnel. Mr. G. Landon Feazell, AMC Safety Director is shown to the right in photo.

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HEADQUARTERS
UNITED STATES ARMY MATERIEL COMMAND
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AMC Pamphlet 385-85 SEPT 1968

The Safety Digest is an AMC Pamphlet prepared by the Safety Division, Headquarters, U. S. Army Materiel Command. Its purpose is to disseminate information which can materially influence and improve safety programs at all Command establishments.

Articles are included to supplement technical knowledge as well as practical knowledge gained through experience. They provide a basis for the further refinement of safety measures already incorporated in operating procedures and process layout. To achieve maximum effectiveness, the Safety Digest should be given widespread circulation at each AMC establishment.

Articles appearing in the Safety Digest are unclassified and are not copyrighted. They may be reproduced as desired in order to bring pertinent accident prevention information to the attention of all employees. The Army Materiel Command Safety Digest should be given a credit line when articles are extracted.

Unclassified material believed to be of interest or benefit to other establishments is welcome for publication in the Safety Digest. Please send articles for review to: U. S. Army Materiel Command Field Safety Agency, Charlestown, Indiana. If possible, include pictures, charts, drawings, and illustrations that clarify and heighten interest in your presentation.

(AMCAD-S)

*FOR THE COMMANDER:

CLARENCE J. LANG
Major General, USA
Chief of Staff

OFFICIAL:

WM. A. GREGORY
Colonel, GS
Chief, Administrative Office

Special Distribution

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NEW EMPLOYEES TAUGHT WORK METHODS AND SAFETY

Safety Department
Remington Office Equipment Division
Sperry Rand Corporation
Louisiana Army Ammunition Plant

Louisiana Army Ammunition Plant has initiated a new program of increased instructions to newly-hired employees. This training program has been developed to instruct new employees in the proper work methods and to instill in them a positive sense of safety consciousness.

The course consists of four hours basic indoctrination followed by eight hours of formal instruction. This is divided between classroom presentations and applied learning on a simulated production line, using inert materials. Instructors include specialists from the Safety Department, Personnel Division, Production Department, and Engineering Division.

Six hours of the training are devoted to emphasizing the importance of proper safety procedures and the necessity for strict compliance with standing operating procedures. Standing operating procedures are thoroughly discussed and explained so that the new employee will realize the importance of always following these instructions. Safety attitudes, general accident prevention, explosives safety, safety promotional activities, and the incentive award programs are included in the safety portion of the course outlines.

Subject matter regarding general accident prevention includes a brief history of the explosives loading business, the AMC Safety Manual (AMCR 385-224), duties of the Safety Inspector, and the employee's responsibilities in the accident prevention program. Information extracted from accident reports and statistical data at this installation is explained.

Individuals are instructed on the reasons for wearing protective clothing and equipment and are shown how to use these items properly. Special emphasis is placed on good housekeeping and the proper disposition of explosives waste. Slide presentations and films are used in conjunction with these classroom presentations.

By performing actual operational tasks on the simulated production line, the individual becomes accustomed to handling items of ammunition. He also becomes familiar with the various machines

and the equipment that are used in the load line operations. During these instruction periods the trainees are also taught how to recognize unsafe conditions as well as to perform their assigned operations in a safe manner.

Upon graduation from this training school, the new employees are assigned to explosives production activities throughout the plant. The results of the training are readily apparent to all first line supervisors due to the reduced length of time required for the individual to become proficient and productive in his assigned tasks and the performance of his duties. In addition, graduates feel more familiar with their work surroundings, learn their jobs faster, and develop a positive safety attitude much more rapidly than before this training course was initiated.

Photo 1

■ These newly-hired employees at Louisiana Army Ammunition Plant are instructed in the proper fit and wearing of protective equipment.

Photo 2

■ Trainees are shown receiving detailed instruction on the characteristics, functions and hazards of an item that is loaded at Louisiana Army Ammunition Plant. A Safety Inspector conducts this formal classroom instruction.

Photo 3

■ Trainees are shown receiving detailed instructions on the loading and assembling of ammunition. Only inert items are utilized during this course of instruction.

Photo 4

■ An instructor is shown training a new employee in the proper operation of a hand tape machine at Louisiana Army Ammunition Plant. Actual operational tasks are performed on a simulated production line.

APPLYING SAFETY TECHNIQUES TO RESEARCH AND DEVELOPMENT

Dennis G. Nelson
Minnesota Mining & Manufacturing Company

The Contract Development Laboratory of the 3M Company has accumulated a considerable background in safety techniques during its work in characterization and development of new high energy oxidizers under a series of Advance Research Projects Agency contracts. Safety techniques have been developed for research, development and small-scale production, as well as for complete chemical analysis and testing of high energy oxidizers. The variety of the hazards encountered and the initial uncertainty concerning their nature required these techniques to be versatile and comprehensive.

The majority of our safety techniques are applications of the following principles:

1. Safety via miniaturization.
2. Safety via dilution.
3. Safety via remote protection.
4. Safety via simplicity of operation.
5. Safety via testing and analysis.

Research Techniques

The typical flow of a Contract Development Laboratory program is from research through development and small-scale production. Our project safety program is organized in the same manner. Most safety data are accumulated at a very small scale to be later applied to larger scale operations.

An example of this is the nuclear magnetic resonance (NMR) detection unit shown in Photo 1. The one-half-inch Plexiglas enclosed glove box provides protection for the operator during sample injection, analysis and withdrawal. This unit is capable of detecting one-half mmole (100-500 mg) of a flourine-containing oxidizer. This minute quantity of explosive material, along with the relatively few manipulative analytical steps required, makes this a safe and versatile tool for the basic researcher.

Farther along in our research-development sequence is the 20 ml "sealless" reactor. These small units are useful in extending NMR data into basic processing information: optimum reaction conditions, conversion rate, identification and resolution of sensitive processing steps. The glass reactor body for this was made from a standard one-inch Pyrex double strength flanged pipe cap. The seven-eighths-inch Teflon coated magnet and magnetic stirring unit are standard commercial items. The Kel-F support rod prevents the magnet from being thrown out of position. This unit develops 200-300 rpm and is suitable for dispensing two-phase liquids, gas-liquid or dilute liquid-solid systems. Its environmental capabilities are from full vacuum to 20 psig, -90°C. to greater than 200°C.

The size and simplicity of these units make them adaptable to oxidizer processing studies where relatively little safety data is available. For rapid processing studies these reactors may be safely placed in a series where they are individually barricaded but still accessible to an operator wearing protective clothing. Photo 2 shows an operator at a multiple hookup. In the event of an explosion, only the glass components of the system would normally be destroyed. Operations might be quickly resumed after replacement of the standard components.

Analytical Tools for New High Energy Oxidizers

A complete set of analytical tools is essential to the safe operation of an oxidizer research and development program. Rapid in-process analyses and supplementary analytical techniques are required. Probably our most widely used tool for both in-process and supplementary analyses is the gas-liquid chromatograph. The micro-liter sample size and the few manipulative steps required for GLC analyses make this a safe, versatile analytical tool. Photo 3 and Diagram 1 show a special GLC hookup. This system has been designed so that both identification and isolation/purfication of two condensible components is possible. A one-half-inch Plexiglas box, with appropriate shielding for the quantity of oxidizer involved (normally less than 50 milligrams), protects the operator while allowing full vision of the operation. The operator is able to monitor his product stream with the chromatograph and switch the three-way valves from vent to trap when a desired product peak appears on the recorder chart. Following isolation in the liquid nitrogen cooled glass traps, a product may be expanded into a separate section of the box where it may be collected into bulbs or vented.

For development and small-scale production facilities,

quantitative tools that can be used remotely are required. A list of simple, versatile measurements that can be made without entering a bay where a dangerous chemical operation is in progress includes:

- 1. Pressure-volume relationships for gases.
- 2. "In-line" graduates for liquids.
- 3. Titration systems for chemical reactions.
- 4. Remote micro-sampling systems for liquids and gases.

Photo 4 and Diagram 2 show a liquid/gas oxidizer sampling system connected directly to a reactor inside the bay. This was designed and constructed for safe, reliable, remote samples of extremely hazardous reactor charges. A maximum of one gram of liquid oxidizer can be present in the sample box to insure a sample representative of the reactor. Special washers around each of the orifices prevent any damaging shrapnel from escaping. Using this device, it is possible to take "in-process" samples at a safe level from a reactor containing up to one-half pound of hazardous oxidizers.

A series of versatile and comprehensive supplemental analyses have been developed for analysis of gaseous liquid and solid oxidizers. (See Table of Milligram Analytical Analyses.) These analyses can be run conveniently on a milligram scale. Conventional protective clothing, such as leather coat, face shield, ear plugs and gloves, is sufficient for the operator's protection.

Development

A quart and a half of development propellant solution is more than enough to create a meaningful hazard. Beginning at the development stage, all oxidizer processing is done completely within remote location facilities. A twin bay concept is used for oxidizer development and small-scale production. The operator is separated from his material by 14-inch reinforced concrete walls. He views the operation through two thicknesses of 4-inch Plexiglas separated by a dead air space. Photo 5 shows a typical reaction bay with the direct drive rods and flexible heavy-duty cables which are connected to process valves. Photo 6 shows the other half of the twin bay where the operator works. The overhead switch panel provides power and control over all electrically driven equipment

within the reaction bay. Services available within the bay include hot and cold water, steam, vacuum, pressure, inert gas and flourine.

Remote, twin bay facilities must be efficiently utilized. For this purpose a cart and cable technique has been developed. Process equipment for a specific application is mounted on portable laboratory carts before it is transferred to a reaction bay. Photo 7 shows one of these carts. Should an operation be terminated or process equipment damaged, the cart is removed from the bay and the next system is wheeled in.

Another concept applied for safe and efficient operation is the use of readily available, easily modified equipment. Conventional glassware, conventional valves, fittings, tubing and other processing equipment are used wherever possible. This allows rapid replacement of key equipment in case of an explosion.

A fourth concept applied to oxidizer handling is the use of flow processes to replace batch processes, particularly where scale-up data is desired. Large quantities of oxidizer solutions are never allowed to accumulate, but are continually transported and mixed through a series of pipes or tubes.

- Safety by Dilution

A good safety practice is to avoid whenever possible the handling of pure fluorochemical oxidizers or highly concentrated solutions of gaseous liquid and solid oxidizers. The diluents and solvents commonly used at the Laboratory are inert gaseous diluents, fluorochemical solvents and conventional organic solvents. A complete history has been accumulated regarding the general processing of such solutions.

- Testing Techniques

An oxidizer testing program which runs concurrently with each significant development project is an essential part of the Laboratory's overall safety program. Before an oxidizer or intermediate may be handled by operator personnel a thorough safety evaluation of the material is made. Determinations such as shock sensitivity, explosive limits of oxidizer solutions, vapor pressure determinaiton in solution, solvent compatibility and specialized tests where required, are common to each new oxidizer which comes into the laboratory. The Laboratory works closely with the Bureau of Explosives

on test programs involving the shipment of our oxidizers and oxidizer solution. Toxicity screening of oxidizers is a recent addition to the safety program.

● Small-Scale Production

By most standards, oxidizer production equipment at the Laboratory seems small. Oxidizer reactor capacity ranges in size from about one and one-half quart to 10 gallons. Our approach has been to produce expeditiously small quantities of fluorochemical oxidizers for propellant evaluation, while retaining a high degree of versatility. The twin bay concept is used throughout production. In a double reaction bay, separated by an operator's control bay, a single operator may conduct operations on either side. Again the cart and cable technique is used as in the concept of using readily available easily modified equipment. The "Barricade Within A Barricade" concept shown in Photo 8 is applied. With these kinds of facilities, up to 10 pounds of high energy material may be prepared at one time. Moderate explosions have occurred within this 10-gallon reactor inside this enclosed bay without causing any other damage in the bay.

Although most facilities at the Laboratory are designed for small quantities, basic raw materials are handled in bulk quantity wherever possible. Photo 9 shows an example of this practice. This unit is a double sealed, liquid fluorine system capable of containing 5,000 pounds of liquid fluorine. The unit is below grade resting on two feet of coarse limestone which would act to neutralize any escaping material. An outer jacket of liquid nitrogen surrounds the fluorine, and there is a vacuum jacket beyond that. Primary and auxiliary shut-off valves are provided and may be operated remotely.

● Safety Program

If, in spite of all precautions, an accident does occur, safety showers, fire stations, fire blankets, protective equipment, fresh air masks and emergency exits are close at hand. An emergency fire station complete with CO_2 cylinder, dry chemical extinguisher, water extinguisher, and an extinguisher for metallic fires is nearby. An emergency horn is mounted on the wall for evacuation alarm.

A vigilant safety inspection program is maintained. A rotating safety committee has been formed which meets once a month and more frequently if the situation demands. Each major project is reviewed for its safety considerations and a monthly inspection of each building is accomplished. Close cooperation with the divisional safety engineer is maintained. Lectures and films are used to promote employee safety consciousness.

Although fluorochemical oxidizers must be considered highly hazardous chemicals, our vigilant safety techniques at the Laboratory have made their processing a routine matter. With extreme cognizance of safety this oxidizer operation is actually less hazardous than many conventional chemical processes where safety is not emphasized to as **great** an extent. ■

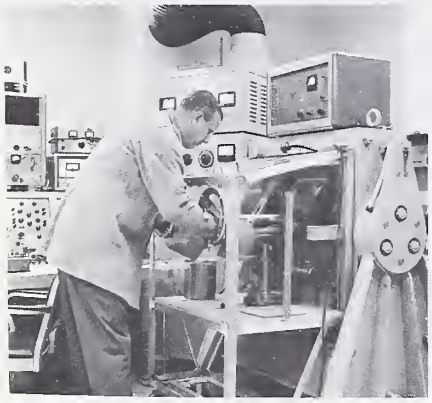


Photo 1

The nuclear magnetic resonance detection unit is inclosed in half-inch Plexiglas.

Photo 2

An operator is shown at a multiple hook-up of 20 ml "seal-less" reactors.

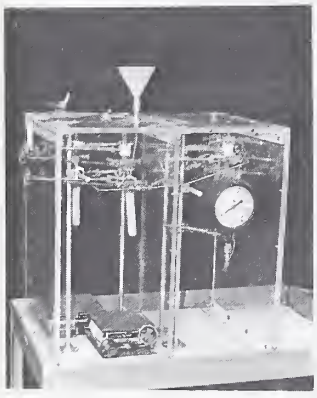


Photo 3

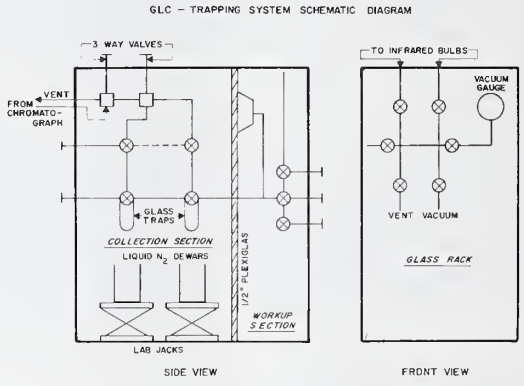


Diagram 1

Details of the gas-liquid chromatograph are shown in this photo and in Diagram 1.

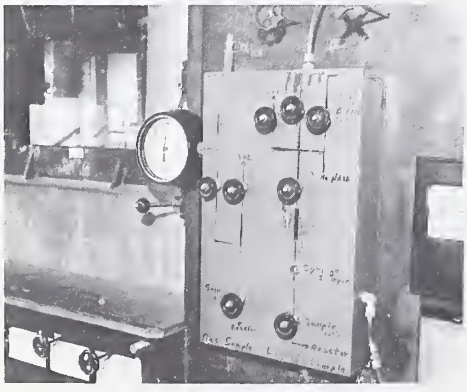


Photo 4

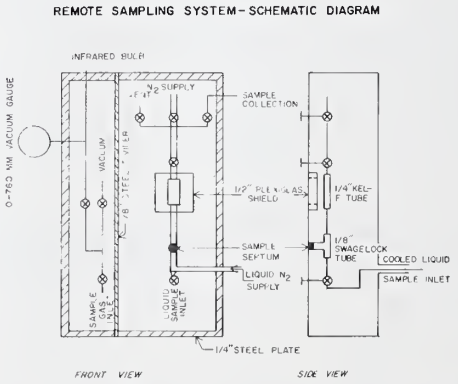


Diagram 2

Details of remote liquid/gas oxidizer sampling system controls are shown in Photo 4 and Diagram 2.

TABLE OF MILLIGRAM
ANALYTICAL ANALYSES

ANALYSIS	*QUANTITY*
OXIDIZING POWER	15 MILLIGRAMS
INFRARED ANALYSIS	2
EQUIVALENT WEIGHT	50
ELEMENTAL ANALYSIS	
Carbon	50
Fluorine	2
Nitrogen	20

Table

Photo 6

The operator outside the barricade manipulates the devices inside the reaction bay. He watches the operation through two thicknesses of 4" Plexiglas, separated by an air space.

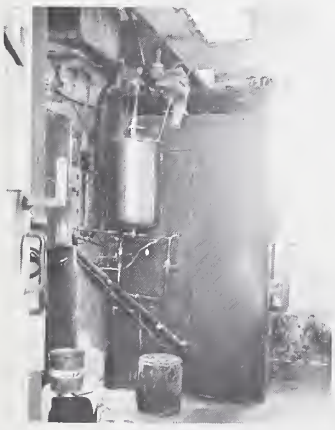


Photo 8

A "barricade within a barricade" double reaction bay, separated by an operator's control bay, permits an operator to conduct operations on either side.

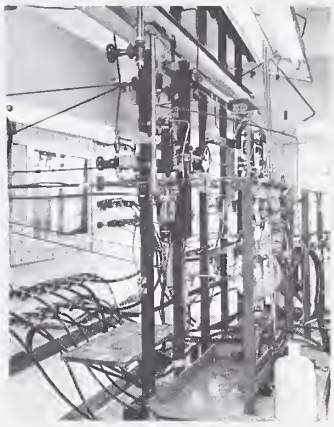


Photo 5

The interior of a reaction bay is shown in this photo.

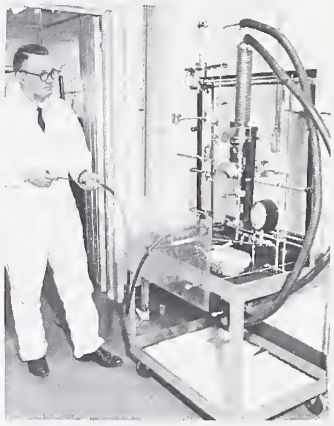


Photo 7

Process equipment for a specific application is mounted on portable laboratory cart. Alternate replacement carts are moved in as required.

Photo 9

The unit shown above is a double sealed liquid flourine system that is capable of containing 5,000 pounds of the material.

SUPERVISORS MUST PUT SAFETY TO WORK

Despite all of the improvements in the physical safety of the plant, it is clear that techniques alone, such as machine guards, protective equipment, and safety devices cannot bring improvements in our accident rate. Investigation indicates the great majority of accidents are caused by the human factor.

○ There are instances where deliberate failure to use equipment and tools properly have resulted in unnecessary injuries. We are aware of instances in the past where an employee suffered an injury because he removed a guard or took a shortcut or by-passed safe work practices. Many of our minor eye injuries can be traced to improper wearing of eye protection such as safety glasses instead of goggles for grinding operations. In some cases a foreign body is introduced by the worker himself when he raises his glasses and rubs his eyes. There are other cases where safety glasses are dangling or left in the pockets and remembered only at the time a foreign body has entered the eye.

○ Many times accident investigation fails to prevent such injuries. We cannot accept this human factor (attitude) as an evil with no solution.

○ We must all recognize that every employee brings a complex mixture of emotions and reactions to his daily job. The worries, fears and aggravations the employee feels, both on and off the job, exert a strong influence on him and reduce his desires and ability to work safely. Efforts must be made to gain the confidence of employees and many solutions to their problems may be found.

○ In our daily contact with employees, environment seems to have some influence. Haphazard housekeeping seems to be in the majority of cases a carryover from previous shifts. Employees become resentful and as a result safety and production will suffer as it will contaminate the entire area.

○ Poor understanding of the job makes an employee ripe for accident or injury. The hazards involved in the process of operation and the necessity to maintain a high standard of housekeeping and adherence to safety procedures should be included in on-the-job training for new employees.

■ The employee who does his work best does it the safe way. The worker who takes advantage of safety devices and follows safe practice rules in the performance of his job not only safeguards his own life, but sets a good example for his fellow workers.

★ Remember that a friendly word of caution to a new man may prevent an injury. How do you relate with your employees?

CORRECTIVE ACTION

		Always	Usually	Seldom
1.	I call attention to all rule violations regardless of the person involved.	___	___	___
2.	When infractions do occur I act promptly to correct them the first time they happen.	___	___	___
3.	Before applying disciplinary measures, I try to determine first if the rule or policy was known and clearly understood.	___	___	___
4.	Before taking any disciplinary action, I give the man a change to explain his actions.	___	___	___
5.	Before taking corrective action, I find out the history of the man's previous action.	___	___	___
6.	I am careful to avoid arguments with my men over their conduct.	___	___	___
7.	I control my temper when correcting my men.	___	___	___
8.	I avoid profanity when correcting my men.	___	___	___
9.	I avoid exaggerated threats in my warnings.	___	___	___
10.	I'm careful not to give so many warnings that my men stop paying attention to them.	___	___	___
11.	My men know that when I caution or warn them, that I mean every word of it.	___	___	___
12.	When correcting, I explain not only what was done wrong, but also why I think it's necessary to correct him.	___	___	___

CORRECTIVE ACTION (CONT'D)

	Always	Usually	Seldom
13. I make it a point to keep written records, (personally, or in the man's personnel folder) of every serious warning or action I take.	___	___	___
14. I make it a point never to brag or boast of the corrective actions I have taken.	___	___	___
15. After taking corrective action, I check to be sure it is having the desired effect.	___	___	___
16. I avoid using departmental transfer to dump my problem men on other supervisors.	___	___	___
17. When completely convinced that disciplinary action is needed, I take it without letting worries of my personal popularity interfere.	___	___	___

PREVENTIVE ACTIONS

1. Every new worker in my department is fully instructed in the working rules of the department and the company.	___	___	___
2. I explain working rules as a natural established part of the job.	___	___	___
3. I review the rules periodically with all my people.	___	___	___
4. I explain to my men the reason behind all the more important work rules.	___	___	___
5. I emphasize those rules (safety, etc.) which do not allow for second chance.	___	___	___
6. I explain carefully to my men any changes in disciplinary policy.	___	___	___

PREVENTIVE ACTIONS

		Always	Usually	Seldom
7.	Wherever possible, I ask my men for their suggestions on preventive actions in department problems.	___	___	___
8.	I appeal to my workers' sense of personal dignity by praising their courtesy and good taste.	___	___	___
9.	My men respect me for applying a firm, fair, and consistent disciplinary policy.	___	___	___
10.	I'm careful not to criticize management decisions and policies to my men.	___	___	___
11.	I avoid trouble by trying to divide and assign the work of the department fairly.	___	___	___
12.	I try to locate and analyze possible sources of trouble before they occur.	___	___	___
13.	In placing my workers, I give consideration to their personal relationship to avoid difficulties.	___	___	___
14.	I make it a point to discourage any talebearing among my men.	___	___	___
15.	My men are inclined to consider me a "Leader", rather than a "driver".	___	___	___

HOW TO SELL COMPANY RULES

■ Why are company rules necessary?

- Rules are as necessary in an industrial organization as they are in a basketball or baseball game. Rules are needed in order that each employee may conduct himself in the same standard way as every other employee; so that each employee may know what is

expected of him; so that he may work as a part of the team with all the other employees.

■ How do rules protect the worker's own rights?

- The purpose of rules is not to limit anyone's rights, but to define and protect the rights of all. Company rules protect each worker from other workers. By neglecting rules regarding safety, one man may easily endanger another man. No worker can be allowed to do anything which in any way interferes with the rights or privileges of another worker.

■ Why is impartial enforcement of rules by the supervisor essential?

- If rules are not reasonably and uniformly enforced for all employees, they soon become ineffective. If a rule is a good one, it is good for everyone. Any worker who sees someone else disobeying the rules has a feeling that he should also be privileged to disobey rules. If a supervisor is not impartial in his enforcement of rules, he will quickly lose prestige.

■ What happens if the supervisor is lax about enforcement of rules?

- A rule unenforced, or enforced only now and then, soon becomes no rule at all. A laxly enforced rule eventually becomes obsolete. The most important principle in the enforcement of rules is to have no more rules than are absolutely necessary, but enforce impartially and reasonably every rule that has been adopted.

⊛ THE RULE BREAKER IS THE ACCIDENT MAKER ⊛

Olin Mathieson Chemical Corp.
Associated Products Operations
Badger Army Ammunition Plant
Baraboo, Wisconsin

PROTECTIVE EQUIPMENT PREVENTS INJURIES

Reports forwarded by an installation Safety Director often provide grim information on property damaged and personnel injured. J. L. Larsen, Safety Director at the Letterkenny Army Depot, has demonstrated that pleasant information can be reported. Protective devices provided employees made it possible for him to tell about the following instances of serious injuries averted:

■ Parts for a steel pallet rack were being removed from a four-foot high stack. A nine-foot steel brace, weighing 60 pounds, was dislodged from the stack. It struck the back edge of an employee's steel toe cap, cut the leather and caused a minor injury. His safety shoe prevented a more serious injury. This employee has been awarded a life-time membership in the Golden Shoe Club.

■ An employee was installing a traversing mechanism in the turret of a combat vehicle. A one-inch diameter by three-inch long bolt came flying through the opening of a turret. It struck him on his safety glass frame at the left temple and broke the frame. He sustained a small laceration above and below the left eye. If this employee had not been wearing his safety glasses he would have sustained serious eye injury.

■ A painter was turning a dolly wheel, with plate, weighing approximately 125 pounds, on a six-inch high pallet. When it was turned, it slipped from his grasp and fell on his foot. The leather at the back of the steel toe was cut and a minor injury only was sustained. It is felt that if the safety toe shoe had not been worn by the employee, injury would have been much more severe.

■ An employee was operating a power saw using a 21" x 1 3/4" high speed blade. He was cutting 25 pieces of steel, from 1 1/4" x 1/2" stock, into 1 1/4" squares. As he was cutting the twenty-fourth piece, the power saw blade broke into several pieces. One flew up and struck the left lens of his prescription safety glasses, shattered the lens and partially knocked the glasses from his face. The employee was not injured because he was wearing his safety glasses.

CAUSES OF AUTO INJURIES

Automotive Crash Injury Research has been conducted for many years at Cornell University. Some of these findings were published in the April 1968 "Safety Newsletter" by the Aerospace Section of the National Safety Council. Of interest, these appeared:

Per Cent Of All Injuries	Causes
24%	⊛ Hitting dashboard or knobs on instrument panel.
21%	⊛ Impact with present-day steering wheels and steering columns.
15%	⊛ Heads and limbs striking or going through windshields.
12%	⊛ Impact with doors and handles of doors and windows.
11%	⊛ Thrown out of car.
8%	⊛ Back of front seat jackknifing in head-on collision and whiplashing in rear-end collisions.
4%	⊛ Hitting roof of car.
3%	⊛ Head or body striking front corner posts.

● Enough is known to now mass-produce vehicles that will result in 50 per cent less injuries and fatalities to their drivers and passengers. In the first reported 55 m.p.h. "death crash" of a collapsible steering column, the driver escaped with only cuts. We are progressing slowly.

- Huntsville Division Safety Dept.
Thiokol Chemical Corporation

■(Editor's Note - Many injuries from the causes listed above can be prevented by the use of seat belts or shoulder harnesses by the driver and his passengers. The National Safety Council has estimated that between 8,000 and 10,000 lives were lost in 1967 through failure to use safety belts. Much larger numbers of injuries could have been prevented.)

HE TOOK ONE STEP BACKWARD

Two Army employees were installing vacuum system piping between two buildings. One worker stood on a flat roof, as shown in Photo 1, to sight down the pipes. The second man, working on a ladder between the two buildings, received information on pipe alignment from the man on the roof. The building had an earth fill that rose to roof level on three sides and an unbarricaded front that was 13 1/2 feet high.

The second man descended from his ladder to move it to another post. He looked up and could not see his fellow worker. He ran up the bank to the top of the building and found the man had disappeared from the roof. He could hear a call for help. He hurried down and ran to the front of the building, where he found the man lying on the concrete pad. (See Photo 2.)

Photo 1

Photo 2

The man on the roof, intent on sighting the pipes, had stepped back too far and fallen over the edge at the front of the building. His fall to the concrete pavement resulted in a crushed bone in his ankle and damage to his third vertebra.

The accident was discussed with all installation employees at their weekly safety meetings. Emphasis was placed on the importance of identifying hazardous conditions and taking precautions to perform every job in a safe manner.

* * *

EXPLOSIVE HAZARD GREW INSIDE REFRIGERATOR

An explosion-proof laboratory refrigerator was purchased new in 1967 and used in one research experiment. This was a crystal growth experiment on lead azide at low temperature. The experiment involved the use of two closed plastic cups that contained 200cc of a five per cent by weight aqueous hydrazoic acid (HN_3) solution. After two weeks storage of the material in the refrigerator, it was determined that this experiment was not successful. The cups were removed and the box was turned off. Only a single alcohol thermometer, hanging near the rear wall, was left inside.

After several weeks passed the refrigerator was needed for another experiment. The research chemist who was to use it opened the door and noticed an odor of hydrazoic acid vapors. The hood in which the box was located had a forced air exhaust system. The chemist left the door open to permit the fumes to be drawn out.

While the fumes were being drawn away the chemist set about cleaning the lower shelf of the refrigerator with a wet paper towel. As he began to wipe the shelf, an explosion occurred within the box.

The explosion broke the thermometer. Fragments cut the chemist's right hand, which was inside the box, and his right cheek. He experienced a temporary loss of hearing and a headache that appeared to have been caused by exposure to the acid fumes. He received first aid at the Post Hospital and returned to duty.

Examination of the refrigerator revealed the cooling panel on the rear wall of the box was bent and fractured. This damage was in the area of the copper coil of tubing (condensor) which carried coolant fluid from the compressor to the cooling panel.

The cause of the explosion could not be determined with absolute certainty. It was surmised that sufficient HN_3 vapor

accumulated during the crystal growth experiment to form a considerable amount (greater than one gram) of copper azide on the copper coil. The chemist's activities in opening and starting to clean the box apparently caused the highly sensitive copper azide to explode.

To prevent similar incidents action was taken to make certain that future growth experiments using hydrazoic acid would be conducted in such a manner that the acid fumes would not be in contact with metal fixtures. No copper fixtures would be associated with future experiments.

(Paragraph 1403, AMCR 385-224 contains the following pertinent statement: "Lead azide shall not be exposed to copper, zinc or alloys containing such metals because of the possible formation of other azides which are more sensitive than the lead azide.")

* * *

TWO TRUCKS MAKE ONE FINGER TRAP

A mechanic was checking the power steering of a truck-tractor. Lying on his back on a creeper, he moved under the left front fender of the machine, which was parked almost bumper to bumper with a fire truck. The two vehicles were about 10 inches apart.

The engine needed to be operated for the proper checks to be made. The man on the floor called up to another mechanic to start the motor. While he waited he rested his right hand on the tractor's bumper.

The second mechanic started the motor without checking to see if the vehicle had been left in gear. The tractor lurched forward. The surprised worker on the floor failed to jerk back his endangered hand. It was caught between the bumpers on the tractor and the fire truck. It was necessary to amputate part of one crushed finger.

The contractor's safety director who investigated identified three factors which contributed to the accident:

1. The mechanic failed to put the gears into neutral before he started the engine.

2. The emergency handbrake of the parked vehicle had not been set.

3. The tractor's wheels had not been blocked while the work was being performed.

Continued on page 24

TURN OFF THE POWER!

Empty wooden boxes were brought into a bay of a manufacturing plant by means of an overhead conveyor system. The boxes then moved down a metal chute to the powered production line conveyor. A 90° turn in the chute brought them into alignment with the second conveyor. (See Photos 1 and 2.)

The boxes sometimes jammed while descending the curved, gravity-fed chute. When this occurred a production operator would reach up and free them. A hazard in this operation was revealed when the worker at the lower end of the chute brought his hand into contact with the powered conveyor.

The boxes jammed in the chute. The operator reached up to free them with his right hand. At the same moment he reached back with his left hand and grasped a conveyor roller to gain additional leverage. The roller turned and pulled the man's hand and then his arm between it and the conveyor belt.

A worker at a nearby station on the conveyor saw the operator was caught. He stopped the conveyor. When the operator's arm was freed, it was found he had a fracture and crushing injury that might keep him away from work for 60 days.

It was determined that operation of the lower level conveyor by a power belt could be eliminated. The belt was removed and workers at the end of the curved chute now use manual power to move boxes over the rollers.

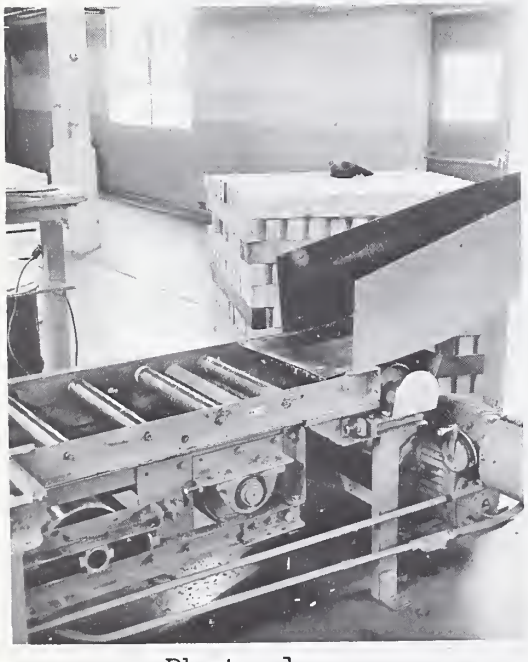


Photo 1

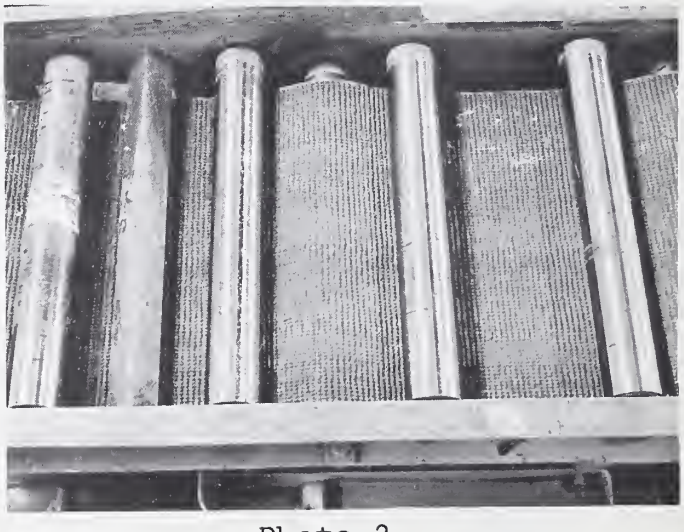


Photo 2

FORKLIFT CAPTURES WELDER

A welder was assigned the job of installing overhead guards on electric-powered forklifts. To do the work it was necessary for him to have access to the top of the forklift mast. To reach this spot he chose to stand on the framework of the lift truck, between the mast assembly and the firewall.

While he was working in this position he lost his footing. He fell back a short distance and landed in a sitting position on the front panel of the truck. At some point in his fall he unintentionally pushed the control lever of the tilting mechanism. This movement of the control caused the mast to tilt toward the rear. It moved until it caught the startled worker and pushed him against the control lever and the steering wheel of the machine.

The welder found himself tightly squeezed. The tilting mast was pushing his body against the control lever. This pressure against the lever led to further tilting of the mast against him. The squeezing force continued until he was shoved into a position with his hips pinned under the steering wheel and his legs against the mast.

Other workers in the shop heard the man crying for help. When they rushed to rescue him, they found they could not operate the tilt control because he was pressed against it. He had to remain crushed in place while a cutting torch was used to cut through the steering column beneath him. This relieved the pressure on his hips enough to permit the tilt lever to be forced forward. This moved the mast forward to a point where the man's legs could be freed.

In spite of the pressure with which he had been held the worker had no broken bones. He did have severe flesh wounds on his hips and legs. He was expected to be away from work for at least two weeks.

Two actions were taken to prevent other workers from being caught and squeezed while working on these machines.

- a. A positive locking device was installed. When engaged it prevents movement of the tilt lever.

- b. All shop employees were instructed to disconnect any power source to equipment before starting work on it.

MOVING SAFETY TO THE FIELD

Thomas P. Browne, Supervisory Safety Engineer
U. S. Army Missile Command Headquarters Operations

After years of experience in safety programs within the continental United States, I had an opportunity to apply my knowledge and experience in a theater of combat operations. This came when I spent a year as Safety Director for the First Logistical Command, the supporting arm of the U. S. Army in Vietnam.

My job there was to establish, develop and direct a safety program. Though I encountered many individual problems that were peculiar to a theater of operation, the safety elements that are basic to an AMC command or installation safety program were generally applicable or adaptable for application in the Republic of Vietnam.

The Headquarters, 1st Logistical Command put into effect an excellent safety program. The program was documented from Headquarters down to unit level. In the larger organizations there was a complete and comprehensive program. In organizations where spheres of responsibility were clearly assigned, the activities were well coordinated, supervision was good and policies well defined. Corrective measures usually were applied as a part of normal day-to-day operating procedures. Where operations were **not** so well organized, securing adequate corrective action was more difficult.

When I completed my tour of duty each subordinate command had in progress a safety training program. The training offered provided specific instructions relative to assigned duties. It was designed to make the individual fully aware of the hazards involved and the safety practices required to offset them.

There are interesting variations between the accident experience in a theater of operations and a command within the United States. Firearms, which are the source of a small number of injuries to AMC personnel, occupied a prominent place as a cause of injuries in Vietnam. Accidents that involved weapons, Army motor vehicles and materials handling stood out in an analysis of our one-year experience.

Quantities of weapons of all types were available because they were required to secure depots, airfields, convoys and installations. Each weapon has safety features incorporated into

the design. These seldom malfunction. However, careless handling and the violations of long established safety rules often negated these safeguards.

Army motor vehicle accidents, as always, were a problem. Narrow and generally poor roadways, a high density of vehicles, heavy pedestrian traffic in the cities and towns, and a lack of adequate traffic controls contributed to hazardous driving conditions. Add to these the same problems we have stateside, such as driving too fast for road conditions, following too closely, backing without a guide, and assuming right-of-way. These are the primary cause factors of most Army vehicle accidents in Vietnam.

Driver fatigue from long periods of driving without rest periods leads to a dulling of reflexes. This slow-down of reflexes coupled with fatigue from a long drive can and often does become a major contributing factor to a serious accident.

One problem we did not have was off-post, off-duty non-Army motor vehicle accidents. The purchase of non-Army motor vehicles was not permitted within the Command, unless the individual had strong justification and the approval of the Provost Marshal.

Off-post, off-duty accidents were mostly fights and falls from same or different levels. Saigon was off limits to all troopers who were not working or assigned to that area. Most of the villages and small towns were off limits because they were not considered secure after the hours of darkness. Disease and unsanitary conditions were other reasons. The work schedule of ten to twelve hours a day, seven days a week, kept the boys close to the bunks during off-duty hours.

Many of our accidents occurred while materials were being handled at docks, piers, depots and up-country user locations. Off-shore loading and unloading during high and rough seas contributed to our lost-time injuries. Unsafe acts committed by our soldiers were often due to fatigue and long hours of stress. Often the result of these was a failure of the individual to take otherwise routine precautions with a machine, explosives, firearms, and many types and forms of materials handling equipment.

The safe securing of loads on vehicles was another problem area. Soldier drivers were sometimes injured when they were required to make a sudden stop and the load shifted forward and crushed them against the steering wheel.

Many fatalities and disabling injuries resulted from the mishandling of undetonated Ordnance products. In some cases the

individuals involved were members of an Explosive Ordnance Disposal team, experienced in the handling of explosives. In spite of training and experience serious accidents still took place.

■ Resting or sleeping beneath Army motor vehicles took its toll.

■ Drownings at off-limit, unauthorized beaches was a problem along the long eastern coast of Vietnam.

One year was too short a time for an ideal safety program to be built in Vietnam. However, a solid foundation was established on which future safety officers and safety engineers could build until a complete and comprehensive safety program would be in effect at unit level.

▶ The attempt by the Department of the Army to establish a safety program within a theater of combat operations proved succesful. It is beneficial to field commanders. A strong command-directed safety program reduces the number of accidents and needless loss of life experienced by the Army in the field.

⊛ Continued from page 19

■ ■ Two actions were taken to correct practices in the automotive maintenance shop:

✔ 1. All automotive shop personnel were briefed on the proper procedure for safely neutralizing a vehicle before maintenance or inspection was performed.

✔ 2. Chain connected wheel chocks were fabricated for use, fore and aft, while vehicle maintenance was being performed.

MANUAL HANDLING OF MATERIALS

■ Much has been said about back and other injuries which have resulted from incorrect handling of materials. Safety education has done a great deal to reduce accidents of this kind, and supervisors have been relied upon to contribute a big share of the education. This is to be expected because the supervisor is close to the work, he knows who and what is involved, and he should be the one best qualified to take immediate and appropriate corrective action. There is no substitute for good timing and a proper approach by him when criticism is necessary. Supervisory tact will invariably win the employees' cooperation in the prevention of repeated mistakes.

■ The alert supervisor will quickly spot the employee who is handling a load that is too big, heavy, or awkward, or handling it in an unsafe way. He will take immediate steps for correction before an accident happens. He knows that accidents not only cause injuries, but they interrupt production, too. He cannot afford either. Nor can he afford to assume that he has finished his job at this point, because the work of positive safety education has only begun. Specific instruction should be given the employee, showing how to do the job safely and pointing out how his safety and efficiency are dependent upon his cooperation.

■ Safety in the manual handling of materials depends upon the attitude and training of each employee, whether he works alone or with others. Both good coordination and cooperation are extremely important.

● Help your employee protect himself against injury by training him to lift, move or carry loads safely.

■ Thiokol Safety Report
Longhorn Army Ammunition Plant

SAFETY FOLLOW-UP SUGGESTIONS FOR SUPERVISORS

- Make sure the new worker uses the right tools. ◉Check frequently to be certain he has the proper tools and equipment.

- Keep an eye on maintenance. ◉Instruct employees not to attempt tool or equipment repairs themselves unless you have authorized them to do so. Faulty or sloppy repairs can lead to accidents.

- Insist on good housekeeping. ◉Neat working areas, open aisles and orderly job habits protect against injury.

- Train thoroughly. ◉Teach employees to follow your instructions carefully and to avoid chance-taking. Let them know that you expect them to come to you for answers when they are uncertain.

- Require employees to use proper safety equipment. ◉Goggles, safety shoes, gloves, are for his protection. If you pound away at these points in safety training, it becomes second nature for the employee to use the protective equipment that guards him against accidents.

- Crack down on horseplay. ◉Horsing around may be fun, but it's a horse of a different color when someone gets hurt.

- Encourage upward communications. ◉Encourage employees to tell you about unsafe working conditions. When they make such reports, act promptly.

- Stress the importance of first aid. ◉Quick attention may reduce the seriousness of an injury. Be sure workers apply for first aid promptly when they're hurt. Also, insist that they report all accidents.

- Set a good example. ◉The best way to encourage employees to follow sound safety practices is to observe all safety regulations yourself.

Thiokol Safety Topic Pamphlet
Longhorn Army Ammunition Plant

ASK YOURSELF SOME QUESTIONS ABOUT SAFETY

■ Is the failure of your personnel to use simple ideas and easy practices causing first aid cases and recordable accidents. Perhaps your attitude and shortcomings in your safety program are a part of your problem. A fresh look at familiar facts and conditions, followed by some honest self-criticism, may be what you need to revive a lagging problem.

➡ Here are starter questions that may help your thinking process. Ask yourself some serious questions and answer them honestly.

● 1. Are you placing accident prevention emphasis on removal of the causes that most often lead to injury producing accidents? Check yourself by comparing the time you spend preventing falls versus the time you devote to Army motor vehicle accident prevention. At AMC installations falls cause many times as many injuries as AMV accidents.

● 2. Do you search for a scapegoat who can be punished for an accident when you should be trying to prevent the next one? Punishment no doubt has its function as a part of discipline, but there are limits to its value. The old-time capital punishment laws, vigorously applied by hanging judges, never succeeded in wiping out sheep stealing and pocket picking.

● 3. Is the first question upon hearing of an incident, "Is there a way to avoid recording this?" If the facts are made flexible enough to force the incident through a loophole, no favor is done the installation. The personnel know what has been done and they apply a mental label of "Fraud" to the safety program.

● 4. How much time do you spend out where the action is? Count the number of disabling injuries and first aid cases you have seen lately from your seat at your desk. You need to see the people, their activities and their working conditions to apply most of your safety knowledge.

● 5. Have you succeeded in keeping your recordable accidents down in spite of a large number of first aid cases? Your installation safety program may be in a terrible shape! Those first aid cases reflect accidents. They are signs of failure. If you do not stop that parade of "little accidents", one will come along that produces a large amount of damage, a serious injury or a fatality.

● 6. Are you sometimes surprised to learn that a recordable accident happened several days ago? There can be no better proof that something is badly wrong with your lines of communication. It is time to get out, mend and rebuild.

● 7. Have you practiced a petty fault-finding attitude that makes your safety inspections irritating? Everybody has encountered the inspector who starts his job with the assurance, "I am here to help you," and then proves he did not mean it. Perhaps you have acquired some of the unpleasant, harmful inspection habits you can recall in others. Now is the time to identify and correct them.

● 8. Do you think your safety job is the most important job at your installation? Come down to earth! Safety is important, but your installation has a mission. You are a member of the first team, but not its captain. By eliminating hazards and preventing accidents, damage and injuries, safety personnel contribute much toward accomplishment of the mission.

● 9. Are you in a safety rut? Do you spend all your time observing, thinking and talking about the same sets of hazards, conditions and facts? This is a recipe for staleness and sterility. Unless you maintain broad interests, both in and beyond safety, you will become dull. If you do not widen your horizon, you may find yourself all alone, going nowhere.

● 10. Do you regularly ask yourself and answer unorthodox questions on safety practices and problems? Progress is being made in many fields, including safety, by people who do just this. They advance because such questions require fresh thinking and may give rise to new and profitable ideas.

CAN YOU SEE WHERE YOU ARE DRIVING?

"To drive safely you must see where you are going."

● This statement is so obvious that it seems useless to repeat it to anybody who can drive. Unfortunately, many drivers may not understand it fully or simply fail to practice it. Files of accident reports contain a high percentage of cases in which one or more drivers failed to see something they needed to see.

➡ Here are suggestions that can help you and the members of your family to see better and increase the safety of your driving:

■ 1. Perform those little acts that will make the other driver aware of you, even if you should fail to see him first. At dusk or dawn or in rainy weather turn on your headlights. Activate your turning signal well before you make your turn. When you cause the other driver to see you, you protect yourself.

■ 2. Remember you see less at dusk and dawn than in bright daylight. The poor light then makes it more difficult to judge distance correctly. Drive cautiously.

■ 3. Keep your speed down to the point where you can stop your vehicle within the clear space you can see ahead. At night this clear space is limited to that made visible by your headlight beams.

■ 4. In daylight watch the scene that is well down the street or highway. Keep the entire traffic scene in view. At modern driving speeds you come up on distant points quickly. If you tailgate, you will see less of this distant scene, and you must react as a captive to another and perhaps poorer driver.

■ 5. Keep your attention on your driving. If you are not prepared, you may fail to detect a hazard in time to take action.

■ 6. Avoid a fixed stare. By looking frequently from side to side and at your rear view mirror you relax your eye muscles and you see much more.

■ 7. Give your eyes time to adjust to sharp changes in lighting levels. When you leave a brightly lighted house at night, allow your eyes to make adjustment to the darkness before you drive away. When you move from a brightly lighted street to dard, open countryside, let your eyes adjust to the increased darkness.

■ 8. Make certain windshields, eyeglasses and headlight glass are clear. If these are dirty enough to reduce your vision, you are imposing a handicap on yourself.

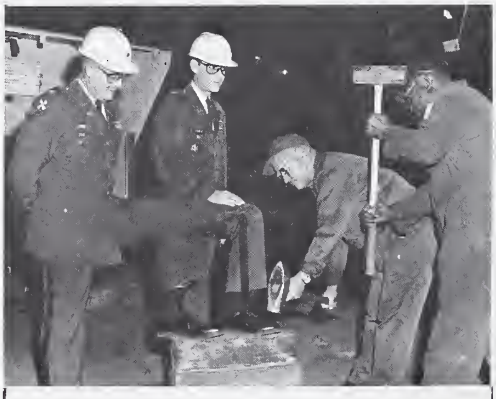
■ 9. Sunglasses and tinted lenses are intended to absorb light. When there is less light they continue to absorb part of it. Never wear them at night or when light is poor.

■ 10. Avoid looking into the glaring lights of approaching vehicles. Look to the right side of the road and dim your lights.

■ 11. Look before you move backward. The driver who is surprised when he backs into something is usually the one who failed to take a good look before he started.

■ 12. Keep out of the opposing traffic lane on hills and curves where your vision is restricted. This space belongs to the other driver. Though his vision is momentarily as limited as yours, he has every right to expect his lane to be free of trespassers.

These suggestions are so simple that they should be practically effortless to practice. When they are followed, they prevent vehicle accidents.



FROM "HEAD TO TOE"

QUESTION: Whozat with the sledge hammers?

ANSWER: That's Bill Mohr and Eddie Adams over in DIRMA.

QUESTION: Whozat wearing the Safety stuff?

ANSWER That's Colonel Hoskin and Lt. Colonel Fox.

QUESTION You mean the big bosses?

ANSWER That's right!

QUESTION H'mm...if it's good enough for them - it's good enough for me!

Safety Office and Photo Lab Granite City Army Depot

Explosives Safety

DESTRUCTION OF ROCKET MOTORS CONTAINING CASE BONDED PROPELLANT

John T. Lacy, Maintenance Engineering Division, NMP
Supply and Maintenance Directorate
U. S. Army Missile Command

Rocket motors containing a non-detonating case bonded propellant can be destroyed with increased safety and efficiency by the use of shaped, molded or flexible sheets of high explosive which split the motor case and ignite the propellant. Certain rocket motors can be made nonpropulsive by this method even though the motor igniter and nozzle have not been removed.

Recently the U. S. Army Missile Command had a requirement to dispose of a large quantity of M30 Rocket Motors (HERCULES) which were classified as unserviceable. The M30 Rocket Motor is the second-stage or "sustainer motor" for the NIKE-HERCULES missile. The motor is 28 inches in diameter, 93 inches long and contains approximately 2200 pounds of a non-detonating case bonded polysulfide perchlorate type propellant.

These motors were formerly destroyed at CONUS depots and certain inland overseas locations by use of the following procedure:

The rocket motor was inverted and placed nozzle end up in a pit approximately eight feet deep, as shown in Photo 1. The motor was then partially covered with earth and initiated through use of standard initiating devices. See Photo 2. The method was found to be expensive and time-consuming.

With the recent advances in flexible high explosives, available in a variety of sheets, cords, ribbons and extruded configurations, the disposal of non-detonable case bonded propellant rocket motors has been greatly simplified. The new flexible explosives are easily cut and safe to handle. They retain their flexibility and explosive characteristics over a wide temperature range and are waterproof.

The Army Missile Command is currently employing the use of M118 (sheet explosive) or Composition C-4 to dispose of the unserviceable M30 Rocket Motors. The method adopted for this operation is to cut the sheet explosive into one-inch by 12-inch strips. These strips are positioned longitudinally on top of the rocket motor in two overlapping layers as shown in Photo 3. The ends of the explosive strips are slotted to receive the blasting cap. A blasting cap is placed in the slot at each end of the strip and held in place with masking tape as shown by Photo 4. The charge is initiated with normal demolition equipment. Photo 5 indicates the appearance of the motor case after burning is complete.

A savings is realized by utilization of this method as the motor need not be buried or restrained. This operation is conducted with the motor lying on the ground and motor movement during burning is negligible. This procedure was thoroughly tested and was approved by the U. S. Army Materiel Command Safety Division before authorization for field use was given. Step-by-step procedures, including inspection and safety requirements applicable to this operation are outlined in TB 9-1410-206-35/2, Rock Rocket Motor, M30 Series, Demilitarization by Detonation, dated 6 December 1967.

Editor's Note: Information will be included in AMCR 385-224 that specific types of large scale Army rocket motors may be destroyed by the methods described in applicable technical publications.

Photo 1

Photo 2

Photos 1 and 2 show two steps in the old method of destroying the case bonded propellant in a rocket motor. The motor was inverted and placed nozzle end up in a deep pit. It was then partially covered and initiated after standard initiating devices were inserted.

In this picture an M30 rocket motor has been laid on the ground. Two strips of sheet explosive, one above the other, have been stretched across the top. The ends of the explosive are slotted to hold blasting caps.

Photo 3

A blasting cap has been inserted in the slot at the end of the two layers of sheet explosive strips. Masking tape is used to hold the blasting cap in place.

Photo 4

The motor cases above show the result of detonation by strips of sheet explosive. The detonation ruptures the case and ignites the propellant it contains.

Photo 5

HIGH SPEED DELUGE FIRE PROTECTION SYSTEMS

S. H. Zollicker
Engineering Manager
Sunflower Army Ammunition Plant

Deluge sprinkler fire protection systems had failed to operate properly on several occasions when fires occurred in buildings processing solid, double base propellant. There was evidence that some of the poor operation resulted from adjustments by unauthorized personnel who did not appreciate the precision required or from tampering by personnel who were curious.

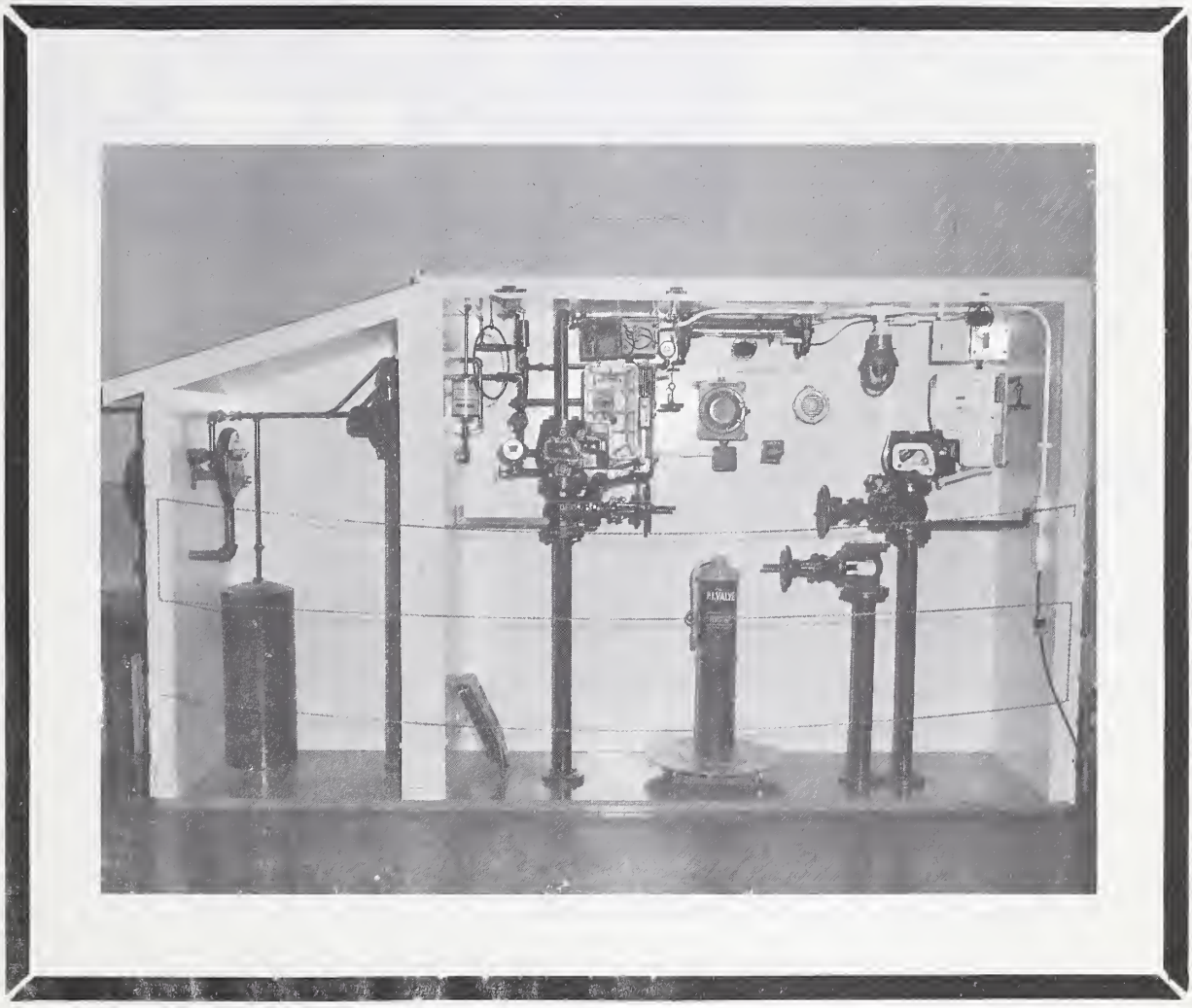
As part of a plan to acquaint all employees with the importance of sprinkler systems, Sunflower Army Ammunition Plant maintenance personnel constructed a model of a complete sprinkler system. The model included operational deluge valve, heat activating devices, air compressor, air pressure gauges, low pressure alarm and manual tripping devices. Both types of manually operated tripping devices in use at Sunflower were installed in the model. One type is activated mechanically, and the other is operated by air pressure release. Water pressure gauges and a post indicator valve were included with the model even though no water supply was connected. Standing operating procedures for the various operating buildings require that these two items be checked in addition to other portions of the system by operating personnel on each shift.

• The model sprinkler system was set up in the Sunflower Plant Safety Theater. Safety meetings are scheduled so that all employees attend at least one meeting there each month. During one month approximately twenty minutes of each meeting was used for a presentation on high speed deluge sprinkler systems.

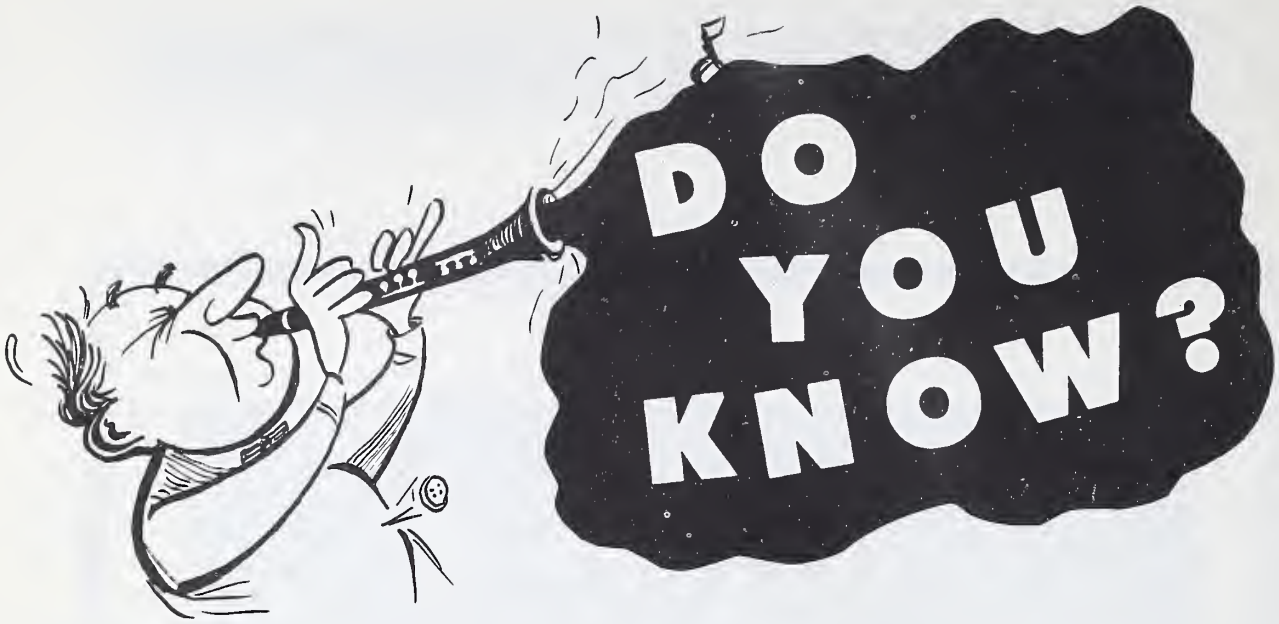
At these meetings the Plant Engineering Manager explained the reasons for installation of special design sprinkler systems in explosives buildings and the principles of operation. Features of operation were demonstrated by activating manual tripping devices, by reducing air pressure to set off alarms and by reference to various working parts in cutaway sections of components in the model. Gauges and other features to be checked by operating personnel on each shift were pointed out and identified. The effects of failure to properly inspect were stressed by demonstration on the model.

• Proper care of the deluge sprinkler system was emphasized throughout the demonstration by use of the phrase, "Deluge systems will protect you, if you will protect them."

Continued use of the model is an integral part of detailed training and retraining of the maintenance personnel who will be responsible for adjusting, maintaining and repairing such systems.



Editor's Note: More information on the Sunflower Army Ammunition Plant Safety Theater was published under the heading "Hercules Safety Theater", in the July 1966 Safety Digest.



Here are ten questions that will test your knowledge of safety requirements that you will need under different circumstances. The answers to all of them may be found in AMCR 385-224. How many can you answer without referring to the regulation? The correct answers and references appear on pages 42 and 43.

1. What is the range of temperature limits for drying initiating explosives such as lead azide and lead styphnate?

   Answer and reference: .....

2. What two quantity-distance classes include items of separate-loading ammunition?

   Answer and reference: .....

3. May any type of plastic container be used for intra-plant transportation and service storage of the more sensitive explosives and explosive mixtures?

   Answer and reference: .....

4. Who is responsible for placing blue flags or signals when personnel are working in, on or under a railway car?

   Answer and reference: .....

5. Where dependence for identification of a fire hazard is placed on a DOT placard only, what fire hazard symbol treatment would be appropriate for a car placarded "Explosives"?

Answer and reference: .....

6. How near an ammunition handling facility may gasoline be dispensed from a mobile unit?

Answer and reference: .....

7. How often should inspections be made of magazines that contain chemical munitions?

Answer and reference: .....

8. When projectiles are to be burned out, how should they be arranged?

Answer and reference: .....

9. What warning signal should be posted during firing on a firing range during hours of darkness?

Answer and reference: .....

10. Where should the air terminals for lightning protection be placed on an igloo type magazine?

Answer and reference: .....

TEST YOURSELF FOR HOME FALLS SITUATIONS

Safety Division
U. S. Army Missile Command Headquarters Operations

Next to traffic accidents falls kill more people than any other type of accident. Each year approximately 20,000 people are killed and more than 12 million are injured by falls. Most falling accidents are on the same level, not from high places. Most of these falling accidents could have been foreseen and prevented.

The real shocker in this falls accident pattern is that over 12,000 of these fatal falls occur in the home.

The subject of death and injury from falls is sounded in a steady theme by safety personnel and statisticians year-in and year-out. Why does the toll continue? What can be done to reduce this needless loss of human resources?

The recipe for reducing falls in the home is a simple one that contains only two ingredients - attitude and action. You and I can fall proof our homes if by our attitudes and actions:

- 1. We care about safety -- not only our safety but the safety of others.
- 2. We recognize a potential accident situation when we see it.
- 3. We are aware of our limitations and abilities.
- 4. By our actions we do things the safe way even if it takes a little longer or is more difficult.
- 5. We remove, repair or avoid potential accident situations when we see them.
- 6. We use proper judgment about ourselves, equipment and situations.

There are about 30 accident situations found in the average home that produce the bulk of fall injuries. They are so recognizable and so common that therein may lie the prevention problem. They are taken for granted and their dangerous nature overlooked.

● Here are 30 questions you can use to check yourself on these common situations. To get full benefit check your answers on a sheet of paper under "Yes", "No" and "Don't Remember" column.

■ 1. Do you use a stepladder for out-of-reach projects, like changing curtains, light bulbs, or reaching the top shelf in the closet?

■ 2. Do you arrange furniture to avoid blocking easy passage around the room?

■ 3. Do you have handrails for all stairs or steps with four or more steps?

■ 4. Do you make sure all four legs of a stepladder are level before using it?

■ 5. Do you have night lights in hallways and baths?

■ 6. Do you fill and level rough areas and holes in your yard?

■ 7. Do you keep children's swings and slides in good condition?

■ 8. Do you place cords for electrical equipment away from walking areas?

■ 9. Do you always buff floors or otherwise remove excess wax after waxing?

■ 10. Do you promptly wipe up spilled water or grease?

■ 11. Are all traffic areas, stairs, basement and garage adequately lighted?

■ 12. Do you leave the baby alone on the bathinette or open bed? Skip the answer if you don't have a small baby.

■ 13. Are your ladders tall enough that you do not have to stand on the top rung?

■ 14. Do you keep trouser and pajama cuffs at proper length to avoid catching your heel?

■ 15. Do you place scatter rugs away from the head and foot of stairs?

■ 16. Do you walk at a safe speed to avoid falls?

■ 17. Do you remove snow and use sand or salt on icy steps and walkways?

■ 18. Do you pick up toys, tools and equipment that could be tripping hazards?

■ 19. Do you use staircases for walking, not storage?

■ 20. Do you have screens or guardrails on windows to protect children?

■ 21. Do you have gates at top and bottom of stairs to protect toddlers?

■ 22. Do you forbid the kids playing on railing and banisters?

■ 23. Do you have non-skid mats for bathtub and bathroom floors?

■ 24. Do you move the ladder when necessary instead of leaning and stretching to reach the work?

■ 25. Do you repair loose boards and worn floor coverings?

■ 26. Do you have handrails for shower and bathtub?

■ 27. Do you wear shoes with non-skid soles and rubber heels that are in good condition?

■ 28. Do you always keep your vision clear when carrying a load of packages?

■ 29. Do you always get help with the ladder for high or dangerous jobs?

■ 30. Do you make the prevention of all accidents a family job?

☐ If your answer is yes to 26-30 of the questions be careful - and start improving.

☐ If your yes answers are below 19 you are a candidate for an ambulance ride.

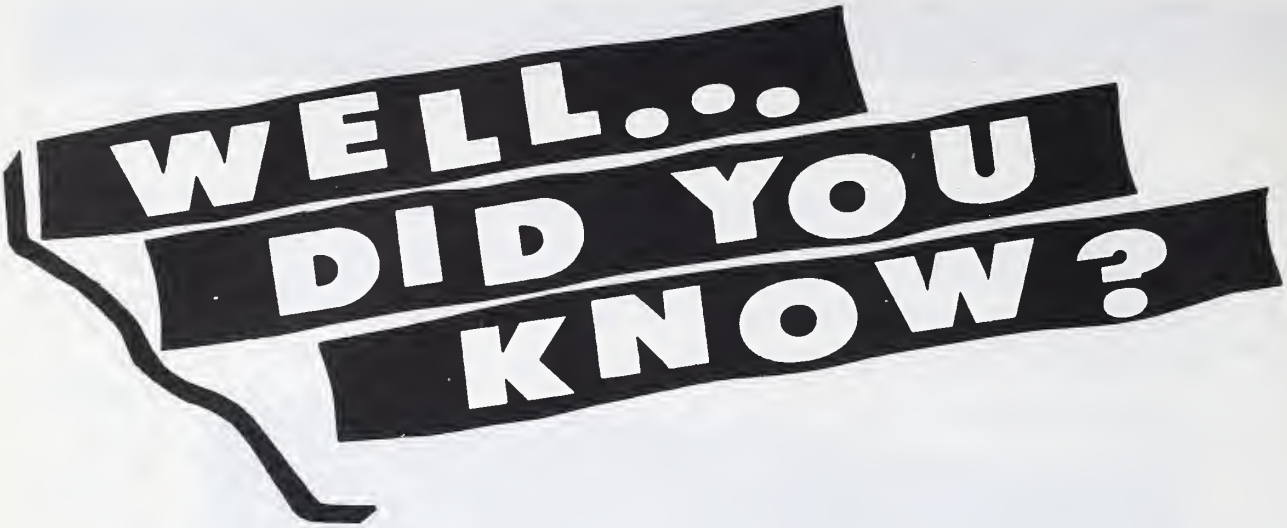
SAFE DRIVERS RECOGNIZED AT WHITE SANDS MISSILE RANGE

○ Sixty-three civilian motor vehicle drivers at White Sands Missile Range have received National Safety Council Safe Driving Awards. Representing 584 accident-free years of driving, the group included 47 bus drivers and five post-taxi drivers.

Heading the list were (from left) William Bassford; Richard Cordero; Jesus Barela; Colonel M. D. Hiers, Deputy for Logistics, WSMR, who made the presentations; Rosalio D. Holguin; and Rafael C. Salas. Bassford and Cordero have completed 18 accident-free years and the others hold 17-year records. Samuel Barela (not shown) also received an 18-year Safe Driving Award.

The White Sands Missile Range bus drivers operate commercial-type, 52-passenger buses. These are used to transport WSMR employees daily to and from the areas of El Paso, Las Cruces and Alamogordo. Each man drives about 25,000 miles a year.

The award winner group also included three men with 15-year safe driving records, one with 14 years, one with 12 years and 16 with 10 and 11 years.



Here are the answers to the questions on pages 36and 37. All questions were based on information contained in AMCR 385-224. A reference to the pertinent paragraph follows each answer.

1. The drying temperatures for initiating explosives are limited to between 122° and 140°F. (50° and 60°C.). The drying is usually accomplished in muslin squares on a drying table or by a special air blowing device. Reference: Paragraph 1401.

2. Classes 5 and 6 include items of separate-loading ammunition. Reference: Paragraph 1429a and change 12, dated 9 Nov 64.

3. No. Containers made of conductive plastics are normally used for intraplant transportation and service storage of sensitive explosives and explosive mixtures. In the order of preference conductive plastic containers rank below those made of conductive rubber and nonferrous metal-lined wood boxes without seams or rivet heads under which explosive dust can accumulate. Reference: Paragraph 2004.

4. The supervisor or foreman in charge of the personnel loading or unloading the car shall be responsible for placing the blue flags or signals and their removal. Reference: Paragraph 2106m.

▶ 5. "Explosive" cars shall be treated as symbol 4 fire hazards where dependence for identification is placed on DOT placards only. Reference: Paragraph 1222a.

▶ 6. Retail quantities of gasoline may be dispensed from mobile units (maximum 350-gallons capacity) at a minimum of 100 feet from explosives and ammunition handling facilities. Reference: Paragraph 1721b.

▶ 7. Magazines containing chemical munitions should be inspected at least monthly and preferably semimonthly to note any unusual conditions. Reference: Paragraph 2903f.

▶ 8. Projectiles to be burned out should preferably be placed on their sides and arranged in groups of not more than six projectiles, with all open ends facing in one direction. Each group of six projectiles should be separated from adjacent groups by not less than 12 inches in order to reduce the possibility of mass detonation in the event of incident in any one group. In addition, projectiles shall be arranged to preclude the wind blowing into the opened-end cavity of the projectile. Reference: Paragraph 2726b.

▶ 9. During hours of darkness a flashing red light should be used to indicate that night firing is being done or is planned in that danger area. A steady red light should be used as a warning to aircraft. Reference: Paragraph 2810c.

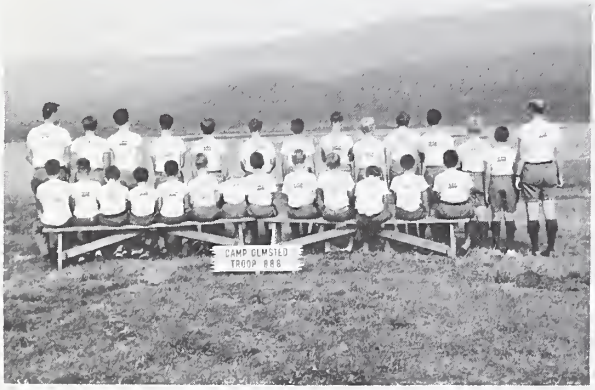
▶10. On an igloo type magazine one air terminal shall be located on the top of the front wall and one on or at the ventilator at the rear. Reference: Paragraph 810.

TACOM PRESENTED NSC AWARD OF HONOR

MG Sheldon Lollis, CG, Tank-Automotive Command, is shown receiving the NSC Award of Honor for Safety from Mr. G. P. Montgomery, Executive Director of the Detroit Safety Council. The award was for the Command operating 8,661,002 man-hours without a disabling injury. Mr. Bob Shirock, TACOM Safety Director, is shown left in photo.

OFF-POST SAFETY EFFORT

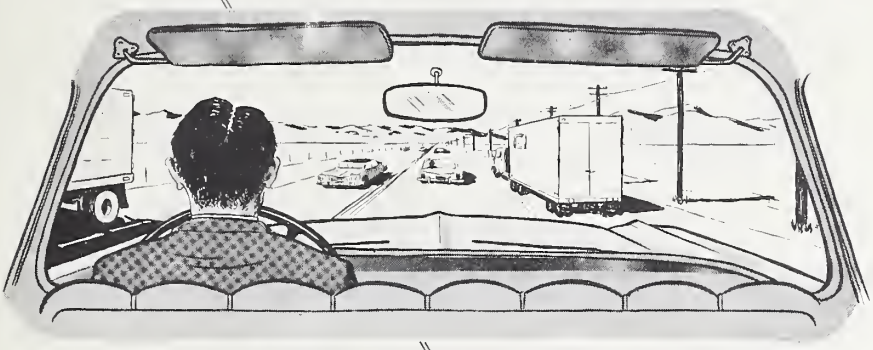
During the past summer months, the American Automobile Association promoted a "Bring Me Back Alive" campaign. This program is centered around today's youth reminding adults of safe driving responsibilities. Boy Scouts of Troop 888, Fairfax District, National Capital Area Council, applied the "iron-on" AAA safe driving slogans on their T-shirts to advertise accident prevention in their neighborhoods and at Camp Olmstead, Goshen Scout Camps, Goshen, Virginia.



Bring ME back ALIVE!

The Scoutmaster of Troop 888 is a member of the Safety staff, U.S. Army Materiel Command. The AAA slogan is shown on the shirt of each troop member.

RAIN can KILL!



IN CLEAR WEATHER, THIS IS YOUR VIEW

Don't CAUSE OR BECOME A *Statistic* !

But.....

IN A RAIN STORM

THE SAME VIEW LOOKS LIKE THIS !

QUALITY SUPPLY & MAINTENANCE
WORLD WIDE SUPPORT
Sharpe ARMY DEPOT

US
MISSION SAFETY 70

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